

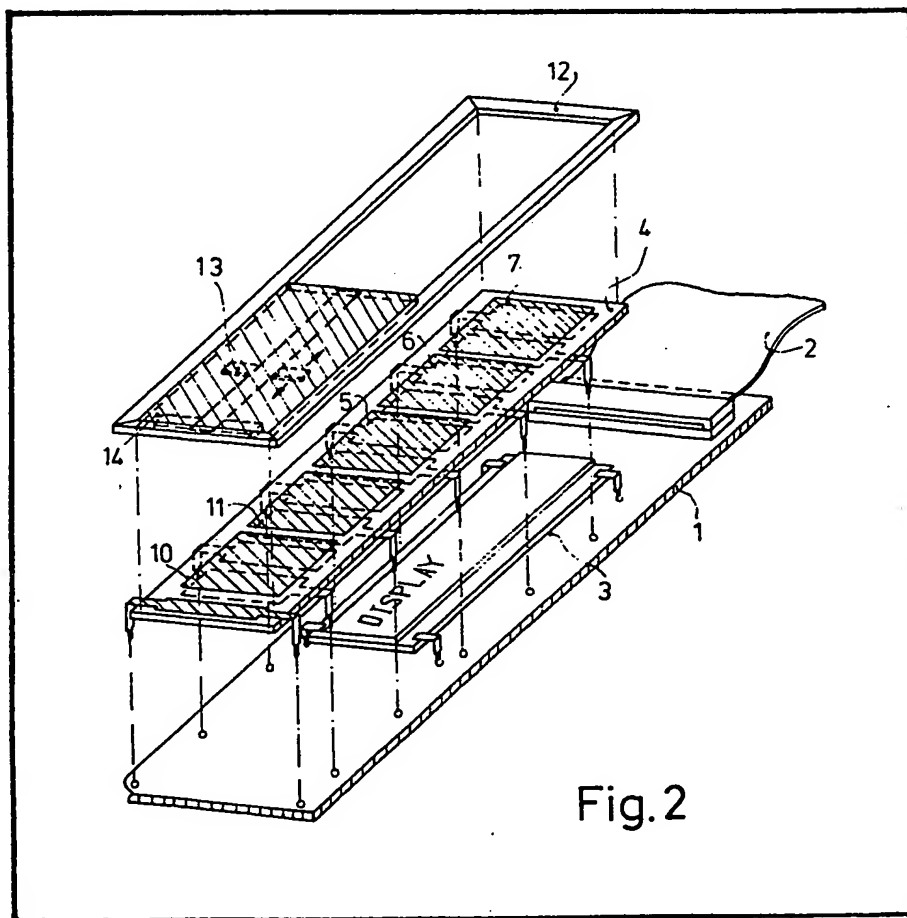
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## (54) Programme Selection Apparatus for Electric Domestic Appliances

(57) A programme selection apparatus for an electrical domestic apparatus e.g. a washing machine comprises an LED or LCD display 3 underlying a panel 4 of touch sensitive switches. A microprocessor causes items to be displayed which are then

checked or selected by the operator by touching appropriate ones of the touch switches. The machine is thus made ready with the desired program and the program initiated. During operation the display may indicate progress and remaining time. Auxiliary elements 10, 11 allow parameters affecting operation such as water hardness to be preset and these are stated to be controlled by a slide 13.



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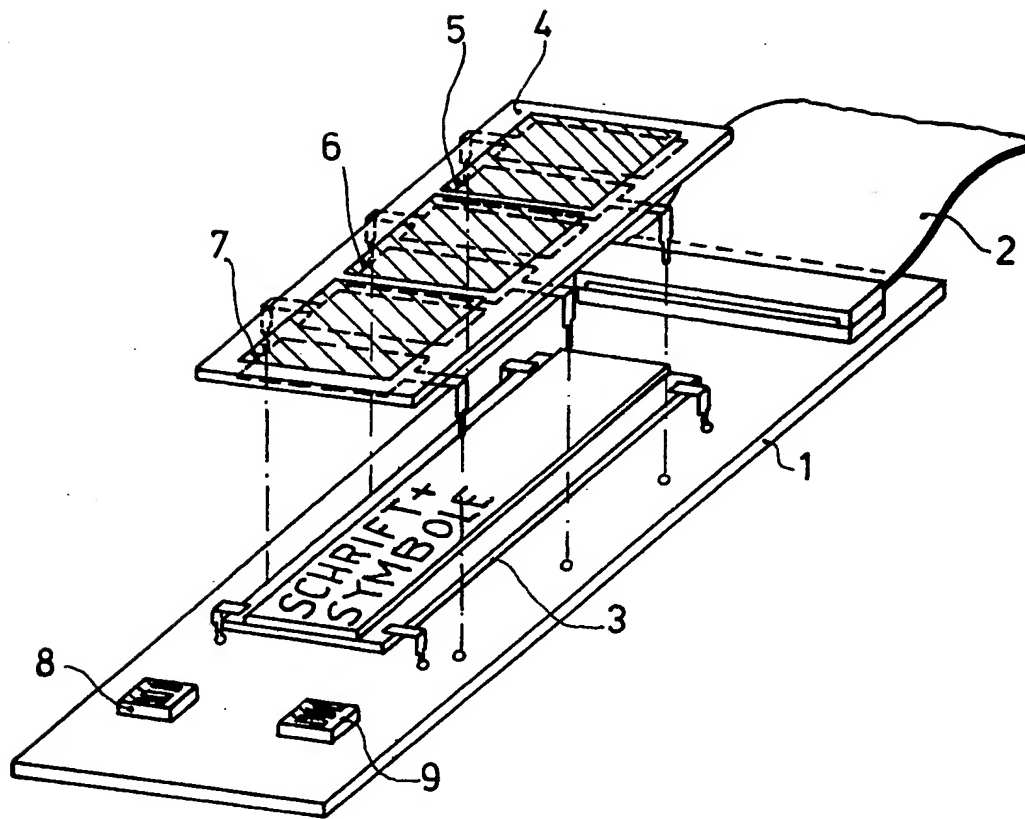


Fig.1

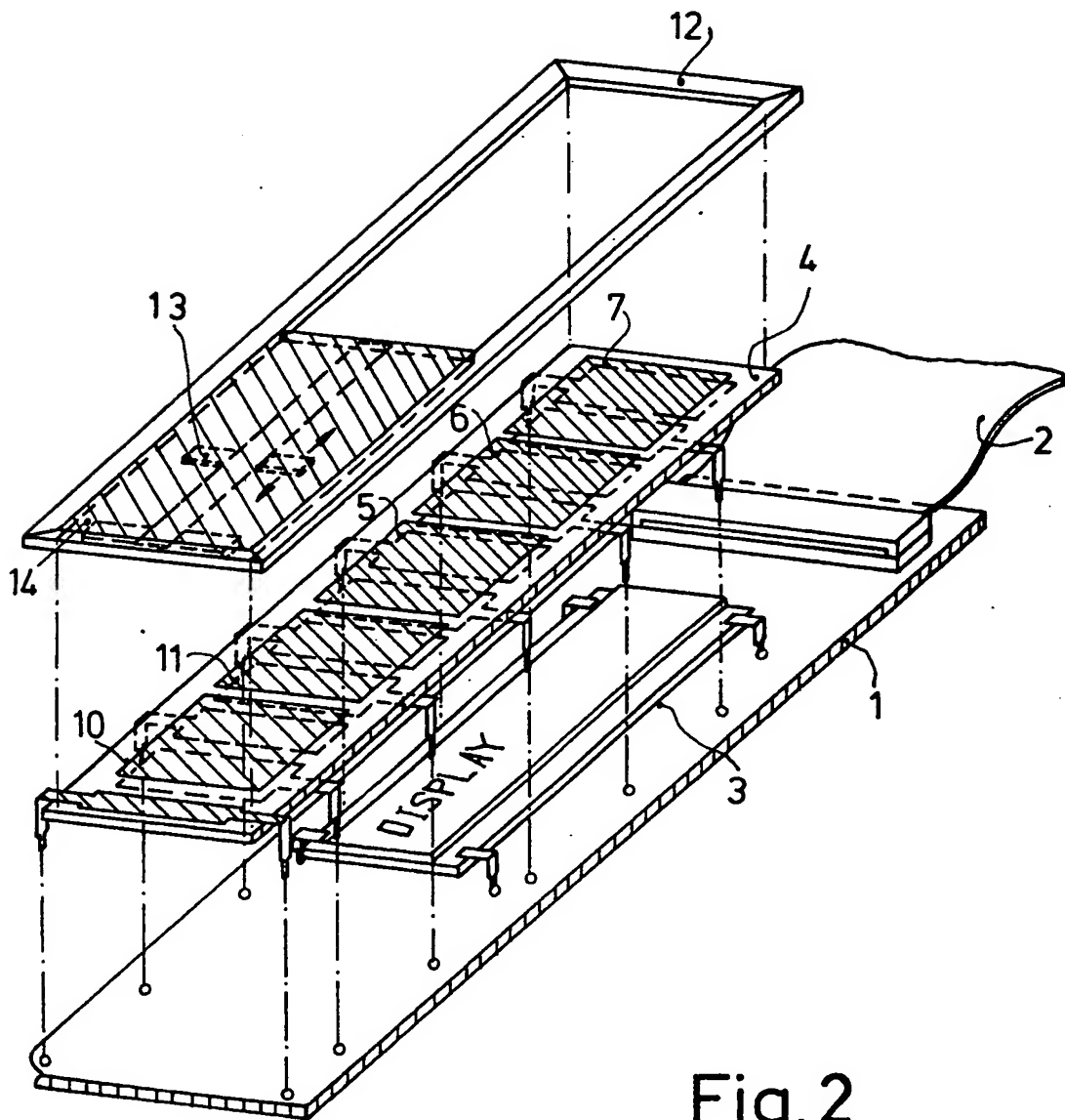


Fig. 2

## SPECIFICATION

**Programme Selection Device for Electrical Domestic Appliances**

The invention relates to a method of controlling the program selection, and possibly also for operational status display in electrical domestic appliances, notably in washing machines and dish washers, in which predetermined programs can be selected or program combinations can be activated in accordance with the load and/or operating conditions.

The invention furthermore relates to a display and control panel for a method of the described kind.

In electrical domestic appliances, notably in washing machines and dish washers, program control devices are provided which enable selection of different programs in accordance with the load of the machine. This program selection is realized in parallel, i.e. there is provided a plurality of buttons or a rotary switch comprising a plurality of switching positions. In addition, many machines comprise selection buttons or selection switches which enable variation of the selected program, for example, reduced amount of water, different temperatures etc. Furthermore, the known machines comprise display elements, for example, a running text or display fields comprising lamps, which continuously indicate the progress of operation, so that the user knows the prevailing phase of operation of the machine.

The usually mechanical program selectors already enable selection of a large multitude of programs and hence adaptation of the machine to different operating conditions, but in many cases they do not allow random composition of the program and hence optimum adaptation to given operating conditions is not possible.

Contemporary electronics enable the use of circuit components, for example, in the form of micro-processors, in which a large number of control steps can be preprogrammed and which can also be used in conjunction with program memories which may construct as ROM (read only memories) as well as RAM (random access memories).

The invention has for its object to provide a method of the described kind which simplifies the program selection in electrical domestic appliances for a predetermined number of programs as well as the display of the progress of operation.

The method in accordance with the invention is characterized in that a preprogrammed control system, for example, a microprocessor, successively supplies the user, *via* at least two display fields with alphanumerical characters and/or symbols, with function instructions as well as program proposals, which are selected by actuation of associated switching elements.

Preferably, the user not only has available two display fields for the display of the alternative selection of programs and program steps, but also an additional display field with associated

switching elements so that if a selection can be made from a plurality of programs, kinds of load and/or program steps, a proposal sequence is displayed on the displays *via* a stepping button.

Furthermore, preferably at least one of the display fields can be activated for displaying the progress of operation and possibly also for displaying the remaining operation time which can be calculated from the selected program and the operation progress by means of the microprocessor.

Using a method of the described kind, for example, it can first be questioned on the displays whether all conditions to be satisfied for the operation of the machine, for example, water tap open, detergent or rinsing agent present, possibly the machine locked, have been satisfied. When these questions are successively acknowledged by actuation of the switching elements associated with the display, it can be questioned on the display, for example, whether one of the fixed programs or a selection program is intended. When the switching element for fixed programs is actuated, each time one or two programs are offered which can be advanced by means of a display button, so that, for example, ten different programs are offered in succession. For the programming of a selection program, besides temperature, degree of soiling, kind of soiling etc., all relevant facts can be interrogated and acknowledged on the display by the switching element.

Thus, while fixed programs are each time alternatively selected or new programs are offered by activation of the stepping, a program is serially composed in accordance with the relevant conditions in the case of composition of a program.

According to the method in accordance with the invention, moreover, the displays and the associated switching elements can also be used as command buttons, for example, for starting the machine, for interrupting the operation or for new selection of a program.

A display and control panel for programmed electrical domestic appliances for performing the described method, comprising a plurality of fields which are provided with alphanumerical characters or symbols and which can be electrically actuated for display, in accordance with the invention is characterized in that the display fields are at least partly covered by transparent but electrically active sensor areas (touch controls).

It is particularly advantageous to provide the sensor areas with electrically conductive, transparent layers which form capacitive areas so that the display fields themselves are constructed as switching elements.

In a particularly attractive embodiment, the panel consists of at least three display and associated sensor areas which are arranged so that two areas serve for the selection possibilities whilst one area serves for advancing the function

proposals displayed but not desired per control program.

It is also advantageous to construct each of the displays to have two text lines so that when the associated touch control is actuated, the command acknowledgement appears *via* the second text line. When graphical symbols are used, the command acknowledgement takes place directly *via* the associated touch control.

The next command can then be interrogated and also acknowledged *via* the second or third display field. For the electro-mechanical construction it is also advantageous to arrange the display and the touch controls on a printed circuit board, in which case the printed circuit board may also be provided with selectable control elements in which values which can be changed during operation by means of adjusting elements can be introduced without display. These values concern, for example, the inlet temperature of the water, the hardness of the water etc. These control values are effectively introduced *via* plug-type bridges or slides and the panel is constructed so that a cover on the panel which can be detached during operation protects these adjusting elements adjacent the transparent touch control fields.

Embodiments of a panel in accordance with the invention will be described hereinafter with reference to the diagrammatic drawing.

Figure 1 shows a control panel for electrical domestic appliances, comprising three touch controls,

Figure 2 shows a corresponding panel where adjacent the touch control elements further adjusting elements for the fixed input of given operating values are arranged.

Corresponding parts are denoted by corresponding reference numerals in the Figures.

A two-line display 3 which is provided with characters and symbols is arranged on a printed circuit board 1 which is connected to the other control and operating elements of the apparatus *via* a flat cable 2. The display is covered by a touch control plate 4 which is provided with transparent, metallic areas 5, 6 and 7. These metallic areas 5 to 7 form, in conjunction with areas situated therebelow, a capacitive switching element which realizes the command control and command acknowledgement. The display areas are preferably provided with elements in the LED or LCD technique or other techniques. Preferably, approximately eight characters per line are provided for each of the displays, *i.e.* underneath each of the areas 5 to 7. In addition to normal text characters, of course, logic symbols can also be used. Adjacent the displays 3, additional elements 8 and 9 are arranged on the printed circuit board 1 in which given operating values can be permanently programmed, for example, by means of plug-type bridges.

Figure 2 shows that adjacent the touch controls 5 to 7 further sensor areas 10 and 11 are provided on the printed circuit board 1. These areas 10 and 11 are controlled by a slide 13

which is arranged in the frame 12 and which is situated underneath a detachable cover 14. The sensor areas 10 and 11 have the same or similar functions as the elements 8 and 9 of Figure 1.

It will be seen that such a panel, having a flat construction, can be simply mounted in the customary faces of a domestic appliance.

## Claims

1. A method of controlling the program selection, and possibly also for operational status display, in electrical domestic appliances, notably in washing machines and dish washers, in which predetermined programs can be selected or program combinations can be activated in accordance with the load and/or operating conditions, characterized in that a preprogrammable control system, for example, a microprocessor, successively supplies the user, *via* at least two display fields with alphanumeric characters and/or symbols, with function instructions as well as program proposals which are selected by actuation of associated switching elements.

2. A method as claimed in Claim 1, characterized in that when a selection from a plurality of programs kinds of load and/or program steps is possible, the displays are activated to display a sequence of proposals *via* a stepping button.

3. A method as claimed in Claims 1 and 2, characterized in that the progress of operation can be displayed on at least one of the display fields.

4. A display and control panel for programmed machines for performing the method in accordance with Claims 1 to 3, using a plurality of fields (displays) which are provided with alphanumeric characters or symbols and which can be electrically actuated for display, characterized in that the display fields are at least partly covered by transparent but electrically active sensor areas (touch controls).

5. A display as claimed in Claim 4, characterized in that the sensor areas are provided with electrically conductive, transparent layers.

6. A display as claimed in Claim 5, characterized in that the display fields are covered by capacitive areas.

7. A display as claimed in Claims 4 to 6, characterized in that at least three display areas and associated sensor areas are provided so that two areas serve for possible selections, for example, for different program proposals, whilst one area serves for the advancing of the function proposals displayed but not desired per program.

8. A display as claimed in Claims 4 to 7, characterized in that each of the displays consists of two text lines so that when the associated touch control is actuated, the command acknowledgement is realized *via* a second text line.

9. A display as claimed in Claims 4 to 8, characterized in that display and touch control

are arranged on a printed circuit board.

10. A display as claimed in Claim 9, characterized in that the printed circuit board is also provided with control elements which enable

5 a fixed selection without display of given control values which can be varied during the operation by means of adjusting elements.

11. A display as claimed in Claim 10.

characterized in that the adjusting elements are

10 constructed as slides and are arranged underneath a cover which can be detached during operation.

12. A display and control panel substantially as herein described with reference to the

15 accompanying drawings.